

1. A holographic image corrector comprising,

a microscope which has,

- a) an optical system having an objective,
- b) at least one pinhole mounted before said objective,
- c) means for recording the characteristics of said objective by sending a first laser beam through said pinhole and through said objective or reflecting said beam therefrom to form an object beam,
- b) means for intersecting said object beam with a reference laser beam in a recording medium to form a hologram of said objective, said laser beams being coherent,
- e) means to replace said pinhole with an article and
- f) means to illuminate said article with a beam of the same wavelength as said laser beams so that light therefrom passes through or reflects off said objective and diffracts through or off said hologram and provides a corrected image of said article.

2. A holographic image corrector comprising,

a microscope which has,

- a) an optical system having an objective,
- b) a pinhole mounted before said objective,
- c) means for recording the characteristics of said objective by sending a first laser beam through said pinhole and through said objective or reflecting said beam therefrom to form an object beam
- d) means for intersecting said object beam with a reference coherent laser beam in a recording medium to form a hologram of said objective,
- e) means to replace said pinhole with an article and

C1
f) means to illuminate said article with a beam of the same wavelength as said laser beams so that light therefrom passes through or reflects off said objective and diffracts through or off said hologram and provides a corrected image of said article.

Cancel claims 9, 10 & 11 and 27 & 28.

15. A method for image correction in a microscope comprising,

C2
a) recording the characteristics of an optical system having an objective, by sending a first laser beam through a pinhole and through said objective or reflecting said first beam therefrom to form an object beam,

b) intersecting said object beam with a reference coherent laser beam in a recording medium to form an interference pattern or hologram thereof,

c) replacing said pinhole with an article and

d) illuminating said article with a beam of the same wavelength as said laser beams, so that light therefrom passes through or reflects off said objective and diffracts through or off said hologram, to provide a corrected image of said article.

C3
16. The method of claim 15 employing an objective at a working distance of at least 10 in. from said article.

18. A method for image correction in a microscope comprising,

C4
a) passing a laser beam through a beam splitter to form separate coherent beams 1 & 2,
b) directing beam 1 through a first pinhole to illuminate an objective and define an object beam,

Sub E3
c) directing beam 2 through a second pinhole to a collimating lens to define a reference beam and then into interference with said object beam in a recording medium to define a hologram,

Cont
C4
Sub
E3
one

d) removing said first pinhole before said objective and replacing said pinhole with the article to be viewed and

e) illuminating said article by a beam of the same wavelength as said coherent beams so that light therefrom passes through or reflects off said objective and through an imaging lens to diffract through or off said hologram to reconstruct the original reference beam but with article information retained, to correct for defects in said objective and to provide an accurate image in a recording medium or for viewing.

19. A corrective hologram maker comprising,

a microscope which has

C5

a) an optical system having an objective,
b) a pinhole mounted before said objective,
c) means for recording the characteristics of said objective by sending a first laser beam through said pinhole and through said objective or reflecting said beam therefrom to form an object beam and

d) means for intersecting said object beam with a reference coherent beam in a recording medium to form a hologram thereof that can correct for defects in said objective.

Sub
C6

21. A holographic image corrector comprising,

a microscope which has

a) an optical system having an objective
b) an array of pinholes mounted before said objective,
c) means for recording the characteristics of said objective by sending a first laser beam through said array and through said objective or reflecting said beam therefrom to form an object beam and

Cont'd
C6

d) means for intersecting said object beam with a reference coherent laser beam in a recording medium to form a hologram of said objective,

e) means to replace said array with an article and

f) means to illuminate said article with a beam of the same wavelength as said laser beams so that light therefrom passes through or reflects off said objective and diffracts through or off said hologram and provides a corrected image of said article.

C7

32. A method for image correction in a microscope comprising,

- a) recording the characteristics of an optical system having an objective, by sending a first laser beam through an array of pinholes and through said objective or reflecting said first beam therefrom to form an object beam,
- b) intersecting said object beam with a reference coherent laser beam in a recording medium to form an interference pattern or hologram thereof,
- c) replacing said array with an article and
- d) illuminating said article with a beam of the same wavelength as said laser beams so that light therefrom passes through or reflects off said objective and diffracts through or off said hologram, to provide a corrected image of said article.
-

C8

33. A method of claim 32 employing an objective at a working distance of at least 10 in. from said article.

C9

36. The method of claim 32 wherein during step d) thereof, said reference beam is also directed at such hologram as before, to form an additional interference pattern of light and dark fringes superimposed on said image, to provide a contour plot thereof.

Sub
E4

37. A method for image correction in a microscope comprising,

- a) passing a laser beam through a beam splitter to form separate coherent beams 1 & 2,

- Sub
seq
ence
conf
9
- b) directing beam 1 through a first array of pinholes to illuminate an objective and define an object beam,
- c) directing beam 2 through a second array of pinholes to a collimating lens to define a reference beam and then into interference with said object beam in a recording medium to define a hologram,
- d) removing said first array of pinholes and replacing said pinhole array with the article to be viewed and
- e) illuminating said article by a beam of the same wavelength as said laser beam so that light therefrom passes through or reflects off said objective and through an imaging lens to diffract through or off said hologram to reconstruct the original reference beam but with article information retained, to correct for defects in said objective and to provide an accurate image in a recording medium or for viewing. NO
-

38. A holographic image corrector comprising,

- C¹⁰
- a) an optical system having an objective,
- b) an array of pinholes mounted before said objective,
- c) means for recording the characteristics of said objective by sending a first laser beam through said array and through said objective or reflecting said beam therefrom to form an object beam and
- d) means for intersecting said object beam with a reference coherent beam in a recording medium to form a hologram thereof that can correct for defects in said objective.

39. A method for objective correction comprising,

- a) recording the characteristics of an optical system having an objective by sending a first laser beam through an array of pinholes and through said objective or reflecting said first beam therefrom to form an object beam and